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- ART. II. — 1. *A History of the Cotton Manufacture in Great Britain, with a Notice of its Early History in the East, and in all Quarters of the Globe; a Description of the great Mechanical Inventions, which have caused its unexampled Extension in Britain; and a View of the Present State of the Manufacture, and the Condition of the Classes engaged in its several Departments.* By EDWARD BAINES, JUN., Esq. London. H. Fisher, R. Fisher, & P. Jackson. 8vo. pp. 543.
2. *Memoir of Samuel Slater, the Father of American Manufactures; connected with a History of the Rise and Progress of the Cotton Manufacture in England and America; with Remarks on the Moral Influence of Manufactories in the United States.* By GEORGE S. WHITE. Second Edition. Philadelphia. Printed at No. 46 Carpenter Street. 1836. 8vo. pp. 448.

THE first of these works, we suspect, is not widely known in this country, though doubtless familiar to those who are personally interested in the branch of industry of which it so fully treats. To the general reader, perhaps, we shall be doing an acceptable service by introducing it to his notice. The second work, being of home manufacture, is, we suppose, better known. Both volumes contain curious and valuable information. The history of the cotton manufacture, beyond any thing else, illustrates the wonderful progress of invention, and the power of machinery. Within the last half-century it has advanced in a manner unparalleled in any other branch of industry whatever.

A considerable portion of the work of Mr. Baines is taken up in tracing the history of the cotton manufacture back to the earliest sources of information on the subject. But the materials for a history like this are scanty. The clothing of the ancients was mostly of wool and of flax. There are but few sentences in all the Greek and Latin, and not one, it is said, in the Hebrew, writers, that refer to garments made of cotton. The manufacture of cotton appears to have commenced in India. For many ages it was confined to that country. Cotton goods are first named as an article of trade among the Arabs, who, in the first or second century of the Christian era, brought them from

India to the ports of the Red Sea. The manufacture of them at this time was prosecuted, to a small extent, in Egypt and Persia. The art was carried by the Moors into Spain, where we have evidence of its existence in the tenth century. In the fourteenth century it was introduced into Italy. But throughout the Middle Ages, down even to the time of the revival of arts and letters, all writers, in describing the progress of commerce and the garments of both sexes, make mention of clothing of woollen, linen, and silk, while cotton was not extensively known. It was not until the invention of spinning machinery in England, that cotton goods, of European manufacture, were used as common articles of dress.

It is our intention to do no more than barely allude to the brilliant series of inventions, made during the last age, which have given such an astonishing impulse to the cotton manufacture, and have formed one of the most splendid triumphs of science, in its application to the useful arts. Only eighty years ago, the machines in general use for the manufacture of cotton were nearly as simple as those of India four thousand years before. That the perfection to which this art has been brought by mechanical inventions, has been attained within that brief period of time, seems, at first, an almost incredible statement. We doubt whether, in the whole compass of art, there is another fact which illustrates in so striking a manner the progress of modern improvement. The ancient method of spinning was by the distaff and spindle. The apparatus for weaving was the Indian loom, — an instrument used to this day in the East, where it is seen suspended between two tamarind trees, with its slovenly-made treadles, beam, and shuttle, — the rude types of the machines in use among us. As late as the middle of the last century, the only material improvement made in these arts was that of exchanging the distaff for the one-thread spinning-wheel, and of constructing the loom with greater firmness and compactness. The loom itself, however, was essentially the same as the ancient instrument of India.

The first improvement in these arts, of which Mr. Baines gives a detailed account, was the invention of the *fly-shuttle*. This was made in 1738. By this invention, the shuttle, which was formerly thrown with the hand, — a slow and laborious process, and, in weaving the widest cloth, requiring

the aid of two persons, — was made to play back and forth in the lathe, in which it runs simply by a sudden jerk upon a handle of wood, connected by two strings with each end of the lathe. A simple contrivance this, but it effected a great saving of labor and time ; and so much did it facilitate the process of weaving, as to occasion a demand for yarn which soon led to another step in the series of inventions. This was the machine for spinning yarn by *rollers*. Mr. Baines, contrary to the general opinion, which ascribes this invention to Sir Richard Arkwright, claims the honor of it for John Wyatt, of Birmingham, who, as he goes on to show, secured letters-patent for it thirty years before Arkwright. It is no part of our purpose to enter into this controversy, or to express any opinion as to its merits. It is certain, that this invention did not come into general notice until 1769, when Arkwright publicly claimed it as his own. By this invention, the one-thread spinning-wheel, which we well remember to have seen in our boyhood in many a rural cottage, was superseded. The cotton was passed through two sets of rollers, the second of which revolved with four or five times the velocity of the first. In this way the cotton was *drawn out*, after which it was caught by a spindle and fly, which, revolving rapidly, *twisted* it into a thread and wound it on a bobbin. These rollers and spindles could be multiplied to any number, so that many threads could be spun at once, and all with wonderful expedition and precision.

Something was now needed, to facilitate the process of *preparing* the cotton for the spinning frame. This had been hitherto done by hand cards. But the process was tediously slow. The application of rotary motion in carding accomplished the desired result. It would be uninteresting to detail the various hints and suggestions, offered by various individuals, which contributed to the perfection of the carding machine. It is sufficient for our purpose to notice the fact, that, in 1775, Sir Richard Arkwright secured a patent for this valuable and beautiful invention. “At one end of the machine,” says our author, “the cotton was put in, an entangled and knotty mass, the fibres lying in every direction, at the other end it came out an even and delicate film, with the fibres straightened, and that film immediately com-

pressed into a uniform and continuous sliver, ready for the spinner." (p. 179.)

The next desideratum was, to invent a weaving-mill, as it was apprehended that hands could not be found to weave all the cotton that would be carded and spun. In 1787, the Rev. Dr. Edmund Cartwright took out a patent for a *power-loom*. It was not, however, until the beginning of the present century, that this machine received its present perfection, and came into general use.

Thus have we glanced at the most important steps in the inventions, which, almost within the last half-century, have revolutionized the manufacture of cotton, and proved most fruitful sources of individual and national wealth.

"When this admirable series of machines was made known, and by their means yarns were produced far superior in quality to any before spun in England, as well as lower in price, a mighty impulse was communicated to the cotton manufacture. Weavers could now obtain an unlimited quantity of yarn at a reasonable price; manufacturers could use warps of cotton, which were much cheaper than the linen warps formerly used. Cotton fabrics could be sold lower than had ever before been known. The demand for them consequently increased. The shuttle flew with fresh energy, and the weavers earned immoderately high prices." — Baines, p. 183.

"The factory system of England takes its rise from this period. Hitherto the cotton manufacture had been carried on almost entirely in the houses of the workmen; the hand or stock cards, the spinning-wheel, and the loom, required no larger apartment than that of a cottage. . . . But the water frame, the carding engine, and the other machines which Arkwright brought out in a finished state, required both more space than could be found in a cottage, and more power than could be applied by the human arm. Their weight also rendered it necessary to place them in strong built mills, and they could not be advantageously turned by any power then known but that of water." — *Ibid.*, p. 184.

"Such, without entering too much into minutiae, are the processes by which the vegetable wool is converted into a woven fabric of great beauty and delicacy; and it will be perceived, that the operations are numerous, and every one of them is performed by machinery, without the help of human hands, except merely in transferring the material from one machine to another. It is by iron fingers, teeth, and wheels, moving with exhaustless energy and devouring speed, that the

cotton is opened, cleaned, spread, carded, drawn, roved, spun, wound, warped, dressed, and woven. The various machines are proportioned to each other in regard to their capability of work, and they are so placed in the mill as to allow the material to be carried from stage to stage with the least possible loss of time. All are moving at once, — the operations chasing each other; and all derive their motion from the 'mighty engine, which, firmly seated in the lower part of the building, and constantly fed with water and fuel, toils through the day with the strength of perhaps a hundred horses. Men, in the mean while, have only to attend on this wonderful series of mechanism, to supply it with work, to oil its joints, and to check its slight and infrequent irregularities; — each workman performing, or rather superintending, as much work as could have been done by *two or three hundred men* sixty years ago. At the approach of darkness, the building is illuminated by jets of flame, whose brilliance mimics the light of day, — the produce of an invisible vapor, generated on the spot. When it is remembered, that all these inventions have been made within the last seventy years, it must be acknowledged, that the cotton mill presents the most striking example of the dominion obtained by human science over the powers of nature, of which modern times can boast." — *Ibid.*, pp. 243, 244.

The effect of these inventions in extending the use of cotton goods, and upon the commerce of the world, will appear from a few statements, for which we are indebted, in part, to the book of Mr. Baines. The importations of cotton into the United Kingdom during the first half of the last century, averaged about 2,050,000 pounds per annum. The importation since 1820, is, on an average, not far from 300,000,000 pounds per annum. In fact, more cotton is imported now in one year into the United Kingdom, than was imported during the whole first three quarters of the last century. The official value of British cotton goods, of all sorts, exported from 1700 to 1764, was not £50,000 per annum. In 1833, the real or declared value of cotton manufactures exported was £18,486,400. The recent exportation of a single year is of greater value than the exportation of the whole of the eighteenth century. The annual value of the whole cotton manufacture for 1833, our author estimates at £31,338,693. The capital employed in the manufacture, he puts down at £34,000,000. The number of persons supported by the manufacture, he computes at 1,500,000.

“ It may assist to form a conception of the immense extent of the British cotton manufacture, when it is stated, that the yarn spun in this country in a year would, in a single thread, pass round the globe’s circumference 203,775 times ; it would reach 51 times from the earth to the sun ; and it would encircle the Earth’s orbit *eight and a half* times !

“ The wrought fabrics of cotton exported in one year would form a girdle for the Globe, passing *eleven* times round the Equator !

“ This manufacture furnishes nearly one half of the exports of British produce and manufactures ; it supports more than one eleventh part of the population of Great Britain ; and it supplies almost every nation of the world with some portion of its clothing.

“ None of the kingdoms of Hanover, Wirtemberg, or Saxony, has a population exceeding that engaged in the manufacture of cotton in this island.

“ The receipts of our manufacturers and merchants, for this one production of the national industry, are equal to two thirds of the whole public revenue of the kingdom.

“ To complete the wonder, this manufacture is the creation of the genius of a few humble mechanics ; it has sprung up from insignificance to its present magnitude within little more than half a century ; and it is still advancing with a rapidity of increase, that defies all calculation of what it shall be in future ages.” — *Ibid.*, pp. 431, 432.

What a miracle of art and industry is here presented to the view ! Our thinkers and scientific inventors are, after all, our true sovereigns. A hundred Georges, and Williams, and Victorias, — we crave her Majesty’s pardon for saying it, — cannot do for Great Britain and the world, what these few humble mechanics have done. How many, with high-sounding titles, and with almost all power in their hands, have passed through life without performing one act of any service to mankind ; while probably there is not a man, woman, or child, in the whole civilized world, that is not better clothed and better fed, by the labors of such men as Arkwright and Watt.

We must not forget, however, that this wonderful extension of the cotton manufacture has not been wholly unattended with evil. The factory system of Great Britain has been a subject of loud and general complaint. If it does so much to clothe the world, it enslaves and degrades, it has been affirmed, the million and a half of human beings that

are dependent on that system for support. The actual physical and moral condition of the operatives, in the factories of England, is an important subject of inquiry. But it is a subject on which it is extremely difficult for us to form a just opinion. The most contradictory statements have been put forth. By some the factory system is represented as overtasking the strength and corrupting the morals of the operatives, as destroying their health, reducing them to a state of the most abject dependence, and hurrying thousands into untimely graves. By others, the truth of all these statements is denied, and factory labor is pronounced to be no more unhealthy, and no more corrupting, than the labor of the same class of operatives in other branches of industry. Moreover, the evidence on this whole subject, which has been from time to time published by Parliament, is equally unsatisfactory. While the report of a committee of the House of Commons represents the factory system of England as being a most horrible system of slavery, that of the Factory Inspectors gives, as positively, an opposite view of the subject; and in such a conflict of testimony, given under such evident biasses of prejudice and interest, we hardly know what statements are worthy of reliance. We propose to express briefly the best opinion we have been able to form, and to state such facts as, from various quarters, we have gleaned.

We have no doubt, then, that there is evil, great and pressing evil, in the factory system of England. In the bringing of large numbers of the lowest and most ignorant laborers together; in the excessive toil to which children, especially, have been forced, while breathing the impure air and the cotton dust of imperfectly ventilated factories; in the absence of means of intellectual and religious instruction; and in that helpless dependence to which they are of necessity reduced, who are unfit for all other kinds of work but that to which from their childhood they are confined, so that they must submit to whatever exactions the cupidity of their taskmasters may impose;—in all these facts, it requires no great sagacity to see causes, which must inevitably operate to corrupt, degrade, and enslave. No doubt, they have heretofore worked to this end with terrible effect. No doubt, also, there are some of them still working together for evil. But it is equally clear, that the condition of the

English operatives has, within the last few years, greatly improved; and we must not suffer our impressions of what English factories have been, to prevent our seeing what English factories have become.

It was a great step, in improving the condition of the manufacturing operatives in England, to limit their work, as was done by the act of 1833, to sixty-nine hours per week; viz. twelve hours on the first five working days in the week, and nine on Saturday. This is a less number of hours than factory operatives in New England generally work, and, considering that factory labor, for the most part, is not hard, it secures the operative against excessive toil. Great attention has been paid of late to the ventilation* of factories. They are made larger and more airy. Pains are taken to confine the cotton dust, and to displace corrupt air, so that operatives are now far less exposed to these sources of disease. And, as to means of moral and intellectual instruction,

* "Our legislators, when bemoaning, not long ago, the fate of their fellow creatures doomed to breathe the polluted air of a factory, were little aware how superior the system of ventilation adopted in many cotton mills was to that employed for their own comfort, in either house of Parliament. The engineers of Manchester do not, like those of the metropolis, trust for a sufficient supply of fresh air into any crowded hall, to currents physically created in the atmosphere by the difference of temperature excited by chimney draughts; because they know them to be ineffectual to remove, with requisite rapidity, the dense carbonic acid gas generated by many hundred powerful lungs. The factory plan is, to extract the foul air, in measurable volumes, by mechanical means of the simplest but most unflinching kind, especially by eccentric pans, made to revolve with the rapidity of nearly one hundred feet per second; and thereby to ensure a constant renewal of the atmosphere in any range of apartments, however large or closely pent they may be. The effect of one of Fairbairn & Lillie's four-guinea pans, upon a large factory, is truly admirable; it not only sweetens the interior space immediately, but renders the ingress of odorous nuisance from without altogether impossible. In a weaving mill near Manchester, where the ventilation was bad, being dependent on currents of equilibration, as in the House of Lords, the proprietor lately caused the pan apparatus to be mounted. The consequence soon became apparent in a curious manner. The work-people, little remarkable for olfactory refinement, instead of thanking their master for his humane attention to their comfort and health, made a formal complaint to him, that the ventilator had increased their appetites, and therefore entitled them to a corresponding increase of wages! The weekly pay of these attendants on steam-going looms, being nearly double of that received by laborers on the breezy plains of Sussex and Kent, could admit of no augmentation under the low rate of profits of trade. But the master made an ingenious compromise with his servants; by stopping the fan during half of the day, he adjusted the ventilation and the voracity of his establishment to a medium standard, after which he heard no more complaint, either on the score of health or appetite." — Dr. Ure's *Philosophy of Manufactures*, pp. 380, 381.

Sunday schools, and associations for mental improvement, have been introduced into the manufacturing villages and cities of England with remarkable success. We believe, that by no class of English laborers have these institutions been more generally welcomed ; nowhere have they awakened a more earnest spirit of improvement, or yielded more gratifying results.

We have no object to gain by defending the English factory system. But when we have heard so much said about the ignorance and degradation of the manufacturing operatives of England, we have asked, Does this charge rest any less lightly on any other class of English day-laborers ? It would be difficult to prove, we apprehend, that the condition of the working class in the factories is in any degree below that of the same class of laborers in other occupations. One thing we suppose to be certain, that the manufacturing operatives have a greater command of the necessities and comforts of life. By the report of the factory commissioners, the fact is incontestably established, that no large class of day-laborers in England receives better wages, than the operatives in the factory. As to the unhealthiness of their occupation, we must remember, that the question is not, whether it is of the most healthy and agreeable kind, but whether, on the whole, it is not as healthy as many other necessary branches of industry. "There is no trade," as Mr. Baines well suggests, "which might not be injurious to persons subject to one kind of weakness or another." "A physician might, if so disposed, get up a case against any employment of civilized life, sufficient to excite public sympathy and abhorrence ; but so long as men cannot live without working, they must work in spite of inconvenience." And as to the effect of factory labor, we see no reason to dissent from the opinion of our author, who says, that

"It is much less arduous than that of the smith, less prejudicial to the lungs, the spine, and the limbs, than that of the shoemaker and the tailor. Colliers, miners, forgemen, cutlers, machine-makers, masons, bakers, corn-millers, painters, plumbers, letter-press printers, potters, and many other classes of artisans and laborers, have employments, which, in one way or another, are more inimical to health and longevity than the labor of cotton mills. Some classes of professional men, students, clerks in counting-houses, shop-keepers, milliners, &c.,

are subject to as great, and in many cases to much greater, confinement and exhaustion, than the mill operatives." — *Ibid.*, p. 454.

Indeed, there are some important circumstances attending the labor of factory operatives that are favorable to health. Among these may be named, the great regularity of their habits of exercise, sleeping, and eating, the uniform temperature of the air in which they work, the consequent diminished liability to disease from sudden changes of atmosphere, and the comparative lightness of their labor. All the hard work is done by the power that carries the machinery. The labor of the factory hand is confined to superintending the operations of the machine, and in keeping that constantly employed.

Still we know that the common impression is, that factory labor is exceedingly unhealthy. The existence of this impression has directed inquiry to the subject. Many facts and statistics have been collected. Our readers may not be unwilling to look a little further into this matter.

When the Factory Commissioners, before referred to, entered upon their duty, they sent a series of questions to the most experienced medical men in the chief manufacturing towns of England. From twenty-seven physicians they obtained written replies. Some of them are distinguished members of their profession. Their practice is among men of all occupations in life, which circumstance gives them a favorable opportunity for judging of the effect of different employments upon health. Some of them are superintendents of hospitals and infirmaries, where careful inquiries are made of patients into their previous business and habits of life. Their testimony is important. We propose to give our readers a few of the questions submitted to them, and to append thereto the abstract of the replies, which is given by Mr. Baines.

“ ‘*Is the mortality among factory children greater than in other classes?*’ To this question, nineteen of the medical witnesses reply in the negative; two speak with hesitation, but fear the mortality is greater; one only answers distinctly in the affirmative; five can give no opinion. Several of the witnesses consider the mortality among the factory, to be less than among other children. Dr. Shaw, physician to the Salford Dispensary, says; ‘I think I might go further, and say

that the mortality among factory children is less than amongst other working classes. Factory labor is better remunerated than any other kind of labor, consequently the children generally are better fed and lodged ; they are less exposed to the vicissitudes of climate ; greater attention is paid to their comfort, at least in the silk and cotton factories of Manchester, many of which I have frequently inspected.' Mr. Holland, who has for forty years professionally attended the apprenticed children at Messrs. Greys' factory at Styall, in Cheshire, says, that 'in the last twenty-two years, with an average of ninety children, there have been only seventeen deaths, of which three died from accidental causes, wholly unconnected with their work ;' thus reducing the deaths to fourteen, or about one in one hundred and forty, which could, by any possibility, be attributed to causes connected with factory labor. Nothing can be more satisfactory than the replies to the above question."

"*Are there any diseases or accidents to which factory children are particularly subject ?*" Eight witnesses reply in the negative, as to diseases ; most of them state that children are liable to accidents from machinery, though not severe, and much less frequent now than formerly, owing to the general casing of the machinery. Several are of opinion, that children are subject to swelled ankles, from long standing, and in some instances to distortion of the knee-joint ; and that a scrofulous or consumptive tendency is increased by this occupation."

"*Are the children of factory operatives inferior in stature to those of your other classes, and to those of the inhabitants of the rural districts in your neighbourhood ?*" The general tenor of the replies to this question is, that the children are less robust, and of somewhat lower stature, than children brought up in rural districts, but not inferior to those living in towns and differently employed."

"*Are the factory operatives more or less attentive to cleanliness and ventilation in their dwellings, than other persons of similar means ?*" Eighteen of the medical men answer, that they are equally or more attentive to cleanliness than other operatives ; four, that they are less so. Dr. Charles Henry, of Manchester, remarks ; 'There is decidedly more comfort and cleanliness among those who work in the factories, than among that class who work in their own dwellings. I regard the factory operatives, as a body, as decidedly superior in their command of the comforts of life, and even of luxuries, to any part of our population.' Dr. Jarrold, on the other hand, says ; 'Women bred in factories can have no domestic habits, and

and are consequently inattentive to cleanliness. They make wretched wives.' ”

Thus, among these practitioners, there was, as might have been expected, some diversity of opinion. Still, there is nothing here to justify the common impression, as to the great unhealthiness of factory labor. Nor is there any thing more said, in any of these returns, against this kind of work, than might be said against almost any other occupation in which the same class of laborers are employed.

The Factory Commissioners obtained a report of an inquiry, made by a committee of the master-spinners, into the state of the work-people in the principal mills in Manchester. The operative spinners themselves furnished answers to a series of questions sent to each mill, “ which answers were collected, and the results drawn out, by a gentleman not engaged in manufactures, John Shuttleworth, Esq., Distributor of Stamps, who swore to the accuracy of his deductions.”* The tables which this gentleman prepared, are interesting and important. We have space, however, only for the summary of them, which we give in the words of Mr. Baines.

“ From these tables it appears, that eight hundred and thirty-seven spinners had worked in mills not less than twenty-two years and three fourths each, on the average ; that seventy-four per cent. of them stated themselves to have good health, twenty and one half per cent. pretty good health, and only five and one half per cent. indifferent health ; that of their wives ninety-six and one fourth per cent. were living, and only three and three fourths per cent. dead ; that the average number of years they had been married was eleven and one fourth, and their average number of children in that time four and one half. The number of children distorted was only one in two hundred and fourteen.” — *Ibid.*, p. 474.

We will only add, on this part of our subject, that the returns of the amount of sickness in the cotton mills of England, obtained by the Factory Commissioners, were submitted to Dr. Mitchell, of London, who compared them with the results of similar inquiries made among workmen in other occupations. The facts thus deduced, he presents in

* Baines, p. 473.

a tabular form, and then expresses the following opinion on the whole ;

“Taking all in all, from the documents brought before me I have seen no grounds for warranting me in believing, that factory labor in any material degree differs, in its effects on health, from other labor ; and at all events, the results ascertained from this long and laborious investigation appear to me to afford unanswerable evidence, that the laudatory and condemnatory exaggerations of both parties are alike unfounded in truth.” — *Ibid.*, p. 466.

The returns, above alluded to, establish another fact of great importance on this point, which we find stated in the work of Dr. Ure on the “Philosophy of Manufactures.” We present it in his own words.

“One of the most valuable accounts of general sickness among the poorer classes, is that contained in Mr. Finlaison’s Report on Life Annuities, printed in 1829. It does not go below the age of twenty, and yet it shows, that seven days in the year is the average duration of sickness among the laboring classes in London, between the ages of twenty and thirty-five, implying, probably, such sickness as would entitle the invalid to receive sick pay from a benefit society. From the returns of the cotton mills it appears, that this amount exceeds very far any degree of sickness known in them, even during the fickle period of childhood. Out of three hundred and seventy-six persons employed in Messrs. Greenwood and Whittaker’s cotton mill, the average time lost by sickness is only one third of a day per annum.” — Ure, p. 398.

We should have been glad to see something more on a subject, which our author very briefly dismisses. We refer to the morals of the factory operatives of England. The common impression doubtless is, that great immorality prevails among them ; and that where so many young people of both sexes are brought together, free from the oversight of their parents, and exposed to all the low and corrupting influences that are supposed to throng around a factory establishment, it is impossible but that a loose state of morals should exist, and vice to a great degree abound. A factory, it has been supposed, is a nursery of licentiousness and crime. Mr. Baines does not pretend to say, that there have not been factories which have corresponded to this description ; he admits, also, that a great deal, not difficult to do, is yet to be

done, to elevate the moral condition of the operatives. But he undertakes to show, that a great improvement has already taken place in their character, and hints at one or two principles, which it is of importance, in forming an opinion on this subject, to bear in mind. One of these is, that the character of the operatives in any establishment depends upon the character of the master-manufacturer. By watchfulness and care, by wise and judicious rules, faithfully enforced, he may elevate the moral tone and character of all in his employ, and preserve as high a standard of morals as is to be found anywhere. Another principle is, that all experience has shown, that it is for the *interest* of the master-manufacturer to do this. Here is a great point. It would not require much experience, one would think, to demonstrate to any overseer the difference, in the order, comfort, and productiveness of his establishment, between a moral and immoral set of hands.

“The neglect of moral discipline,” says Ure, “may be readily detected, in any establishment, by a practised eye, in the disorder of the general system, the irregularities of the individual machines, the waste of time and material from the broken and pieced yarns. . . . It is, therefore, excessively the *interest* of every mill-owner to organize his moral machinery on equally sound principles with his mechanical, for otherwise he will never command the steady hands, watchful eyes, and prompt coöperation, essential to excellence of product.” — *Philosophy of Manufactures*, p. 417.

Of late this is beginning to be understood ; and hence the great attention which is now paid to the moral education of the operatives. We see this especially in the noble institution of Sunday schools, which, as we remarked before, is nowhere received with more welcome, or cherished with better results, than among the factory operatives of England. There are some very gratifying facts connected with this subject. We will allude to but one of them, for the account of which we are again indebted to the work of Dr. Ure. The town of Stockport contains sixty-seven factories, in which 21,489 operatives of all ages are employed. In 1805, a large Sunday school was erected by voluntary contribution, chiefly of mill-owners, at a cost of £10,000. In the annual report of this institution, for 1833, the committee state ;

“Since its commencement the names of 40,850 scholars have been inscribed on our registers, a considerable part of whom have received a moral and religious education within our walls. Part of the fruit of these pious labors is already reaped, in a temporal point of view, in the general decorum that pervades this town and neighbourhood, and the regard for the liberties, lives, and properties of others, evinced by the Stockport population at a period of political excitement, in which they were too much disregarded at other places. The well-judged liberality of the public has now made Sunday schools so common in our borders, that it is hardly possible to approach the town of Stockport, in any direction, without encountering one or more of these quiet fortresses, which a wise benevolence has erected against the encroachments of vice and ignorance.” — *Philosophy of Manufactures*, p. 410.

“When I visited this school,” says Dr. Ure, “there were from four thousand to five thousand young people profiting by the instructions administered by four hundred teachers, distributed into proper classes, and arranged in upwards of forty school rooms, beside the grand hall in the top of the building. I witnessed the very gratifying sight of about fifteen hundred boys, and as many girls, regularly seated upon separate benches, the one set on the right side, the other on the left. They were becomingly attired, decorous in deportment, and of healthy, even blooming, complexions. Their hymn-singing thrilled through the heart like the festival chorus of Westminster. The organ, which was excellent, was well played by a young man, who had lately been a piecer in the spinning-factory of the gentleman who kindly attended me on the occasion.” — *Ibid.*, p. 411.

Now this is encouraging ; and to such a degree have these institutions actually elevated the character of the operatives, that several clergymen, on examination, certified to the Factory Commissioners, that they considered the morals of factory operatives to be quite as good as those of other work-people. The same opinion was expressed by Dr. Hunter, a celebrated physician of Leeds.

“I do not consider,” said he, “the factory population in this town more immoral than the same class out of the mills. I have always found them, male and female, as modest in demeanor as any other class of working people.” — *Ibid.*, p. 395.

On the whole, it appears evident, that the factory system of England has done something more than increased im-

mensely the industry and wealth of the kingdom. It has improved the condition of the poorer class of laborers. They are better clothed, better fed, better paid. The poor rate has diminished, in a series of years, in places where factories have been established. Less has been paid in manufacturing districts for the support of the poor, than has been paid in agricultural districts for the same object ; while the spirit of intelligence, the institutions of learning and Sunday schools, which are beginning to distinguish the manufacturing operatives of England, all promise to elevate them much above the day-laborers employed in other branches of industry.

Of the second work named at the head of this article, we shall be able to give only a brief notice. Some facts, however, which it enables us to present, relative to the rise and progress of the cotton manufacture in this country, will interest our readers, and suggest a few remarks upon the condition and character of the factory operatives in New England.

It appears, that the first attempt to erect carding and spinning machinery in this country was made at East Bridgewater, in Massachusetts. This was as early as 1786. The enterprise was regarded with so great an interest, that the General Court, by a resolve passed November 16th, 1786, gave the machinists £200 to encourage their ingenuity. The year following, £20 were given to Mr. Orr, of East Bridgewater, under whose direction a model machine was constructed ; and that gentleman was requested, in the resolve, to exhibit his machines, and to give all information in his possession respecting them.

In 1787, the proprietors of the Beverly Cotton Manufactory, in Beverly, Massachusetts, made an attempt to introduce the manufacture of cotton, by machinery, into this country, "in imitation," as they set forth in their petition to the General Court in 1790, "of the most useful and approved stuffs, which are formed of that material in Europe." The object of the petition referred to was to obtain aid from the General Court, "to indemnify them for extraordinary expenses and losses," and to promote the further advancement of their enterprise. The petition was referred to a committee, of which Nathaniel Gorham was chairman, who reported ;

“From the best information we can obtain, we are of opinion, that the said manufactory is of great public utility. But, owing to the great expenses incurred in providing machines, and other incidents usually attending a new business, the said manufactory is upon the decline, and, unless some public assistance can be afforded, is in danger of failing. Your committee therefore report, as their opinion, that the petitioners have a grant of £ 1,000, to be raised in a lottery.” — *Memoir of Slater*, p. 55.

The third attempt, in the order of time, to manufacture cotton by machinery, in this country, was made in 1788, at Providence, Rhode Island. Three enterprising citizens of that place entered into an agreement to manufacture what was then called “home-spun cloth.” Draughts of the machines at East Bridgewater and at Beverly were procured, and carding and spinning and weaving machines were set up, in the chambers of the market-house at Providence, and were operated there.

Contemporaneously with this, an attempt was made in Philadelphia to manufacture cotton by machinery. This was attended with more success than any of the other experiments. In a report of a committee to the Board of Managers of the “Pennsylvania Society for Promoting Manufactures and the Useful Arts,” it is stated, that up to August 23d, 1788, there had been manufactured of jeans, corduroys, cottons, flax-linens, tow-linens, &c., four thousand and sixteen yards.

“But, notwithstanding these laudable and persevering efforts made by the people of Massachusetts and Rhode Island, and, soon after, of Pennsylvania, New York, and Connecticut, they entirely failed, and saw their hopes and prospects prostrate. In looking for the causes of such disasters, we find no deficiency of enterprise or exertion, none of funds, and none of men who were ready and willing to engage in the business, and no lack of patronage from the government, they having learned from experience the privations during the Revolutionary war. All must be attributed to the fact, that, during all the incipient struggles, Great Britain had in operation a series of superior machinery, which Massachusetts and Rhode Island had endeavoured to obtain in vain.” — *Memoir of Slater*, pp. 61, 62.

It was at this critical period, that Samuel Slater arrived in this country from England. He had served a regular

apprenticeship in cotton-spinning, under Jedediah Strutt, a partner of Sir Richard Arkwright; and, tempted by a reward which he had heard had been offered by a Pennsylvania society for a machine to make cotton-rollers, he determined to push his fortune in this country. Bringing out nothing but his indenture of apprenticeship,* he arrived in New York in November, 1789. In January, 1790, he left New York for Providence, where he soon made arrangements, with Messrs. Almy and Brown, to set up the spinning of cotton at Pawtucket. With his own hands he commenced making machinery, working with indefatigable industry, night and day.

“ On the 20th of December following, he started, as he says in an account written by himself just before his death, three cards, drawing and roving, and seventy spindles, which were worked by an old fulling-mill water-wheel, in a clothier's building, in which they continued spinning about twenty months; at the expiration of which time they had several thousand pounds of yarn on hand, notwithstanding every exertion was made to weave it up and to sell it. Early in the year 1793, Almy, Brown, and Slater built a small factory in that village, (known and called to this day ‘the old factory,’) in which they set in motion, July 12th, the *preparation* and seventy-two spindles, and slowly added to that number as the sales of the yarn appeared more promising, which induced the said Slater to be concerned in erecting a new mill, and to increase the machinery in the old mill.” — *Ibid.*, p. 42.

The Arkwright inventions were now in successful operation in this country. We should be glad to give some account of the trials and perplexities through which Slater passed, of the gradual extension, by his labors, of the cotton manufacture, and of its final and permanent establishment, not only in the neighbourhood of his first experiments, but throughout the land. But our limits forbid. Through alternate periods of prosperity and great depression, the manufacture has most wonderfully increased. The little State of

* The stories often told of Mr. Slater's bringing out models of machinery, of a remarkable dream suggesting to him to supply a band upon one of the wheels, for want of which his machinery did not operate. and of secret attempts made upon his life by the connivance of the English Government, our author, on the authority of Mr. Slater himself, pronounces to be without foundation.

Rhode Island is literally dotted over with cotton mills. They are found every few miles on the whole length of the Blackstone river. They give industry and wealth to hundreds of flourishing villages in New England. They have built up large towns and cities, like Waltham, Fall River, Dover, Nashua, Lowell.

A few statistical facts* will give us the best idea of the vast extension of this business in this country, during the present century. In the "Memoir of Slater," it is stated, that in the year 1805, the total consumption of cotton by the manufactories of the United States was a little more than three hundred and sixty-one thousand pounds. The quantity now consumed is estimated at one hundred and fifty million pounds per annum. The value of cotton goods manufactured in the year 1815, is stated to have been twenty-four millions of dollars. The value of the annual manufacture is now estimated at sixty millions. The capital employed in manufacturing by machinery, in 1815, was forty millions of dollars. The capital now employed is estimated at one hundred and ten millions. The value of the exports of cotton goods from the United States, in 1826, is stated to have been one million one hundred thousand dollars. The value of exports in 1834, was two million two hundred thousand dollars. The number of persons at present employed in the manufacture of cotton we shall soon have means of knowing, by the recent census of the United States. We think it cannot be less than one hundred thousand.

What is the physical condition and moral character of this large class of our population? This is a question full of interest to the patriot and the philanthropist. We begin the few remarks we have to offer on this subject by observing, that the New England factory system is very different from that of Old England. The points of difference are important, and yield immense advantages to the New England operatives. In the first place, we have hardly such a thing as a fixed factory population. Four fifths of our factory opera-

* For these facts, we are indebted, when no other authority is named, to a letter from the Secretary of the Treasury to the Speaker of the House of Representatives, dated February 29th, 1836, "On the Cultivation, Manufacture, and Foreign Trade of Cotton"; and to an article on the "Statistics of Cotton," which may be found in Hunt's "Merchants' Magazine," for September, 1839.

tives are young girls, who, leaving their homes in the country, work on an average from three to four years in the cotton mills, and then return to fill the stations in life of wives and mothers. The other fifth are young men, whose honorable ambition it is to become acquainted with the business of manufacturing, that they may rise to the situations of overseers, clerks, and superintendents. This class is of course more permanent. The other is continually fluctuating. Undoubtedly it is an evil to the manufacturer. He is continually losing experienced operatives, and receiving raw hands. But what he loses here, he more than gains in the better character of those he employs. The factory girl, whose intention it is to return, in a short time, to her native village, must carry back the unsullied reputation with which she left her father's house. Here is one of the strongest motives that can be felt to secure, not only the good morals, but the perfect decorum and propriety of conduct, of the operatives under his care. And it is felt by them all. There is no case of that self-abandonment, which we see in those who feel that they are doomed to be always just what they now are. And more than this, there is no such thing as a large, dependent class of people, hanging around our manufacturing villages, unfit for any thing but factory labor, subject, therefore, to the will of their employers, and in their helplessness and hopelessness growing more abandoned themselves, and tainting the whole neighbourhood with their corruption. This is, beyond all question, the greatest evil of the manufacturing system of England; but a class of operatives like this cannot be found in any factory village of this country.

Another peculiarity of the New England factory system is the plan of corporation boarding-houses. This plan was first tried at Waltham, Massachusetts, and has gradually extended itself throughout New England, excepting in Rhode Island, where, under Slater, the English system was introduced. The boarding-houses are erected by the mill owners, and are let, at reduced rents, to the families that keep them. The advantages are obvious. The whole moral *régime* of these houses is under the sight and control of the master-manufacturer. Their neat, comfortable, and healthy state, the regularity and good order of their management, and the strictly moral conduct of their inmates, he can look

after, and it is his duty to secure. The deportment of his operatives, both while in the mill and out of it, is thus under his oversight and care. How admirably this system has worked, the good order of all our factory villages, and the healthy moral tone of feeling that prevails in them, abundantly prove.

Still another thing that distinguishes our factory system from that of England is, that we employ but few children. It is stated in the work of Baines, "that more than one third of the mill operatives in England are children, half of whom are under fourteen years of age."* In 1831, according to Pitkin's "Statistical View of the Commerce of the United States," there were 27,936 factory operatives in the New England States. Of these there were but 3,990 under twelve years of age. It is remarkable, that of that number Rhode Island alone had 3,472. This is more than fourteen fifteenths of the whole. It is in Rhode Island, as we remarked above, that the English factory system most prevails. The machinery there used is, for the most part, of a kind with which the labor of children is profitable. But throughout the New England factories generally, children are not wanted. They are "more plague than profit." Thus, of the 8,507 operatives employed in Lowell, there are not 150 under fifteen years of age. And, in respect to these, the law passed in the year 1837 is strictly enforced, which requires that no person, under fifteen years of age, shall be suffered to work more than nine months, in any year, in a factory, the remaining three to be passed at school. Nothing need be added, to show what a great advantage, to our manufacturing population, our factory system has, in this particular also, over that of England.

There is no class of laborers in New England, that is so well paid, clothed, and fed, as our factory operatives. Such care is taken of their health, both in the mills, and in the boarding-houses, that no more sickness of any kind prevails among them, as physicians of the most respectable attainments and character attest, than is found among laborers of the like class in any other employments of life. We know what declamatory assertions have been sometimes made, of the demoralizing effect of our factories, and of the infamy

which cleaves to every young woman who has been a factory operative. But we know, also, that the least inquiry, in any well conducted manufacturing establishment in New England, will prove such assertions to be false. A greater slander was probably never proclaimed ; not against the female operatives themselves, but against their fathers, their mothers, the guardians of their virtue and their honor. It is in the virtuous homes of our farmers and mechanics, that the young women are reared, who work their three or four years in the factories. That they are sent, year after year, to places where their morals are sure to be corrupted, and where an eternal reproach is fixed upon their names, is a charge against their parents, which the very men who bring it cannot themselves believe. In remarking upon the moral condition of our manufacturing establishments, those who have not carefully inquired into their practical operation overlook one fact, which it is very important should be kept in mind. It is the *interest* of the mill-owners to make the villages, which their establishments create, desirable places to live in. Not only must the accommodations for the operatives be comfortable and healthy, but the moral atmosphere which they breathe must be pure. If it is not, the manufacturer loses his hands. Let those who are continually returning from the factories to their fathers' houses, go back with a ruined reputation, or with a blot upon their fair names, and the only supply of operatives, which the manufacturer has, is cut off. If we had a fixed, dependent factory population, it would be different. Such a class of operatives must work, however unhealthy or however corrupting their labor may be, or they must starve. Free from the curse of such a population, the sure instinct of self-interest secures a high standard of morals in most of the manufacturing villages of New England.

As an illustration of these remarks, we would, in concluding this paper, refer to one of the largest manufacturing places in the country, and one in which the actual working of the New England factory system may be most fully seen. In the city of Lowell, there is a manufacturing capital invested of \$10,500,000. There are 32 cotton mills in operation ; running 166,044 spindles, and 5,183 looms ; consuming 19,256,600 pounds of cotton, and manufacturing 58,263,400 yards of cloth, per annum ; employing 6,430 female, and

2,077 male operatives. This city has grown up entirely within the last twenty years, and now has a population of over twenty thousand. A more orderly and moral city, we believe, can nowhere be found. Indeed, there are some facts pertaining to the character of this city, which are of a remarkable nature. There are in it sixteen organized religious societies, in which, it is ascertained, are enrolled about seven thousand Sunday school pupils and teachers, being one third part of the entire population of the city. The rule, here rigidly enforced by the manufacturers, of employing none who are addicted to the use of ardent spirits, has had the effect to make this city more free from the vice of intemperance, than any other city that can be named. And then, as to the sin of licentiousness, which is supposed to be the peculiar taint of factories, we would refer to the following statement, which we find quoted in the "*Memoir of Slater*," from Carey's "*Essay on Wages*." It is taken from an account, furnished five or six years ago, to the late Mr. Carey, by a gentleman of well-known character for integrity and philanthropy, who then had charge of one of the largest establishments in Lowell.

"There have only occurred three instances in which any apparently improper connexion or intimacy had taken place, and in all those cases the parties were married on the discovery, and several months prior to the birth of their children ; so that, in a legal point of view, no illegitimate birth has taken place among the females employed in the mills under my direction. Nor have I known of but one case among all the females employed in Lowell, — I have said known, — I should say heard, of one case. I am just informed, that this was a case where the female had been employed but a few days in any mill, and was forthwith rejected from the corporation, and sent to her friends. In point of female chastity, I believe that Lowell is as free from reproach as any place of equal population in the United States, or the world." — *Memoir of Slater*, p. 168.

There are some facts, also, pertaining to the health of this population, which are exceedingly interesting. Bills of mortality have been kept for a considerable number of years, with great accuracy. These have been carefully collated, and from them the following facts have been derived, by a distinguished physician of Lowell, which we present in his own words.

“More than one half of our population are between the ages of fifteen and thirty years, and a great proportion of these are employed in the mills. In the year 1830, the population stood, by an actual census, at six thousand four hundred and seventy-seven; the number of deaths was one hundred and fourteen, and of this whole number only seven occurred among the persons employed in the mills. In the year 1828, the population, in round numbers, was three thousand five hundred. The number of girls employed in the mills was, also in round numbers, fifteen hundred. During that whole year, there was not a single death, in the city, among these fifteen hundred girls. I ask those who are versed in the lore of medical statistics, to match these two facts. Even if they were picked facts, they would be none the less extraordinary. But they are not picked facts. They are the only ones, and they are all of the kind which are contained in the tables before me. If, now, I am asked whether I consider these results as average results, — as safe *data* on which to rest our conclusions, as to the degree of health enjoyed by our other population, I frankly answer, No. I do not believe, that the other years would have given such results. They are too extraordinary to be looked for. But they are still of very great value. They show positively, absolutely, undeniably, a state of things wholly, irreconcilably, inconsistent with the existence of a feeble, deteriorated, and unhealthy population. I know that in 1828, and probably in 1830, girls, who had been here some time during the year, died during the year elsewhere. I know that, in making all these statements, we are constantly to bear in mind the circumstance, that a certain number of girls leave this city while sick, and die among their kindred. But the number is easily ascertained, and it is far from being large. Means are now in operation, by which the number of girls who leave the mills on account of any ill health, will be accurately ascertained. Until this work is finished, I can only say, that, so far as the investigation has been carried, it corresponds with all the other facts relating to this subject, in showing an average state of health, and freedom from disease, most satisfactory and gratifying.

“It may be objected, that the rate of mortality is not alone and in itself an infallible, or even a safe, standard of the general health; that the actual number of deaths in any given population, during a given year, may be small, while the standard of health is low, and the absolute amount of ill health is great. I admit that this is very possible, and that it sometimes occurs. But it can only be true under peculiar circumstances, and within certain very narrow limits. It cannot be true of a large population, through a series of years. It can

only form an apparent exception to the general law of relationship between disease and the rates of mortality ; and careful observation will always enable us to detect these exceptions, and to make in their favor, or on their account, all necessary allowances.

“The general and comparative good health of the girls employed in the mills here, and their freedom from serious disease, have long been subjects of common remark among our most intelligent and experienced physicians. *The manufacturing population of this city is the healthiest portion of the population*, and there is no reason why this should not be the case. They are but little exposed to many of the strongest and most prolific causes of disease, and very many of the circumstances which surround and act upon them are of the most favorable hygienic character. They are regular in all their habits. They are early up in the morning, and are early in bed at night. Their fare is plain, substantial, and good, and their labor is sufficiently active and sufficiently light to avoid the evils arising from the two extremes of indolence and overexertion. They are but little exposed to the sudden vicissitudes, and to the excessive heats or colds of the seasons, and they are very generally free from anxious and depressing cares.” *

The healthy condition and the correct deportment of the Lowell operatives, have been observed by every one, who has seen the long lines of them retiring, at the close of labor, from the mills. All are well dressed, and you behold no more impropriety of conduct, than you see in the most fashionable streets of any city. A distinguished Englishman, on seeing the throngs of operatives leaving the mills, could not but express his surprise, that every one of them had on *shoes*. His wonder would have ceased, had he known that each of these operatives was earning, on an average, two dollars per week, clear of her board ; that the sum paid out for wages in Lowell is \$ 160,000 per month ; that out of 1,976 depositors in the Lowell Institutions for Savings, 978 are factory girls ; and that of the \$ 305,796 deposited on interest, \$ 100,000 belongs to them. His wonder would have ceased, had he been told of the man, who, broken down by unfortunate speculations at the South, removed his wife and family of daughters to Lowell ; and there, forgetting their former affluence, and relying hopefully upon their

* *Letters on Lowell and its Population*, Published in the “Lowell Courier,” in 1839, by Elisha Bartlett, M. D.

own exertions, honestly paid off, in a few years, by the fruits of their labor, an old incumbrance of over two thousand dollars, and realized enough beside to give an enviable education to his children. He should have been told, also, of the poor widow, who, running in debt for every cent of the furniture of her boarding-house, paid for it all in a short time, and by eleven years of industry and economy, saved the snug sum of fourteen hundred dollars, with which she purchased a quiet retreat for her old age in the country.

We intended to have said a word or two upon the schools in Lowell, which will not suffer by comparison with any others in the Commonwealth; upon the spirit of intelligence there manifested, in the patronage extended to lyceums, libraries, and lectures; and upon the noble hospital recently established there by the owners of the mills, for the benefit of the operatives in their employ. But we have already exceeded our limits. We can only express the firm conviction, that the manufacturing population of New England, in intelligence, respectability, and good morals, is at this moment decidedly in advance of the same class of laborers in other branches of industry; and we have no doubt but that, by still greater improvements in machinery, by a reduction of the hours of labor, and by a more earnest attention to means of moral and intellectual training, they will lead the general progress in knowledge and in virtue.

ART. III. — *Two Years before the Mast. A Personal Narrative of Life at Sea.* New York: Harper & Brothers. 1840. 24mo. pp. 483.

THIS is, in many respects, a remarkable book. It is a successful attempt to describe a class of men, and a course of life, which, though familiarly spoken of by most people, and considered as within the limits of civilization, will appear to them now almost as just discovered. To find a new subject in so old a sphere of humanity is something; and scarcely second to this are the spirit and skill with which it is handled. It seems as if the writer must have been favored with